PROGRAM BOOK

WC 2006

WC 2006

World Congress on Medical Physics and Biomedical Engineering

Aug. 27 - Sep. 1, 2006 COEX Seoul, Korea

"Imaging the Future Medicine"

The Triennial World Congress of IUPESM
The 15th ICMP of IOMP
The 21st ICMBE of IFMBE

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T22 S1 Neural Network & BCI

08:00-09:30, Tuesday, August 29 — 321C

Session Chairs : James Jungho Pak, Daryl Kipke

5001. Invited Talk – "Advanced Implantable Microscale Neural Interface Devices" — ***08:00***
Daryl Kipke

5003. Electrical Stimulation Induced Neuronal Clustering in Cultured Neural Network — **08:30**
Sung June Kim, Jae Kyoo Lee, Jong Keun Song, Sang Beom Jun

5004. Finding Directional Movement Representations in Motor Cortical Neural Populations Using Nonlinear Manifold Learning — **08:45**
Michael Black, John Donoghue, Odest Jenkins, John Simeral, Sung-Phil Kim

5005. Neural Network Model of Cell Survival under Hyperthermia — **09:00**
A.G. Trofimov, O.A. Mishulina, Vladimir Kosterev

5016. Wireless Telemetry for Micro Intracortical Neural Implants — **09:15**
Daryl Kipke, Rushali Parikh, Jongwoo Lee

T23 S3 Invited Talk II

09:00-09:30, Tuesday, August 29 — 308

Session Chairs : Kwang-Sup Soh

5111. Magnetic and Bio Electrical Signal Measurement at Acupuncture Treatment in Human — **09:00**
Kyuseok Ahn, Jinseok Moon, Young Huh, Eehwa Kim, Sang Yong Jeong, Sung Tae Koo, Yeonhee Ryu, Sun Mi Choi

JC1 S4 Instrumentation I

08:00-09:45, Tuesday, August 29 — 320C

Session Chairs : Hermann Scharfetter

5517. Invited Talk – "Study and Comparison of the Repeatability from Different Bio-Electrodes under Various Conditions for EIT" — ***08:00***
Mawan Al-Akaidi, Martin Brien, Li Wang, Wei Wang

5513. Invited Talk - "Wideband Current Source Structures for EIT" — ***08:30***
Ramon Bragos, Daniel Anton, Pere Riu

5515. Invited Talk – "Reduction of Electrode Position Errors in Clinical Imaging" — ***09:00***
Camille Gomez-Laberge, Andy Adler, Chris McLeod

5516. Preliminary Report of Optimisation of In-Vitro Studies with an In-Vitro Specimen Measuring System — **09:30**
Marwan Al-Akaidi, Martin Brien, Wei Wang, Li Wang

JC2 S4 Mobile Healthcare System

08:00-09:30, Tuesday, August 29 — 320B

Session Chairs : Toshiyo Tamura, Wooshik Kim

5615. Invited Talk – "Smartphone-based Approach for Monitoring Vital Physiological Parameters in Humans" — ***08:00***
Igor Sergeev, Maxim Jatskovsky, Garik Markarian, Sergey Schookin, Alexander Kobelev, Oleg Medvedev

5616. Invited Talk – "Optimal Body Area Network for u-Healthcare" — ***08:30***
Pil June Pak, Soo Jin Huh, Dong Ik Shin

5618. Ambulance Service Area Placing with Overlapped Efficiency Indexes — **09:00**
Shu-Wen Chen, Yung-Tang Shen, Dah-Ming Shiah

5619. MDoctor for DM: Development of Ubiquitous Healthcare System for Diabetes Self-Management — **09:15**
Hyun Soon Ahn, Jin Tae Kim, Sang Kyung Lee, Se Hyun Han, Kye Hyun Kim, Kwan Yoo Kim

Symposium 3 (08:00 - 09:30)

SY 3 Women in Medical and Biological Engineering: Worldwide Perspectives

08:00-09:30, Tuesday, August 29 — 403

Organizer : Maria Siebes

Session Chair: Maria Siebes, Yoonshin Lee

Abstract Preview

Electrical Stimulation Induced Neuronal Clustering in Cultured Neural Network

Sang Beom Jun[2,1] Jong Keun Song[1,2], Jae Kyoo Lee[1,2], and Sung June Kim[1,2]

[1] Nano Bioelectronics & Systems Research Center, Seoul, Korea, [2] School of Electrical Engineering and Computer Science, Seoul National University, Seoul, Korea

aquilia@empal.com

Planar microelectrode arrays (MEAs) have been used to provide a means for long-term, simultaneous recording of electrical activities from neural networks. Using microcontact printing, we produced grid neural networks on MEAs previously. However, action potentials were not always recorded from the electrodes even though neurons were observed on nearly the electrode sites. This inefficiency for functional recording sites may be an obstacle for optimal MEA use. One possible contributing factor for this observation is low neuron density since neurons in vitro may have far fewer synapses when compared to neurons in vivo. At lower densities neurons may not receive sufficient synaptic input to develop into functional networks. Therefore, we hypothesized that electrical stimulation on neural network might provide greater neurotransmitter release and promote neuronal growth. By using an ASIC chip, we developed a portable current stimulator which can deliver biphasic current stimulation with programmable parameters (amplitude: 2~1024 μA, pulse width: 10~320 μs, pulse rate: 10~800 Hz). The amplitude and pulse width were fixed within a safe range preventing neuronal cell death. And the effects of various stimulation rates were examined. After stimulating neurons for several days during culture days, neuronal clusters were produced around the stimulating electrode site. This result will be presented as a movie clip. We also accessed firing rates of signals recorded from the electrode. The neuronal clustering in neural networks were visualized by using immunocytochemistry.

Keywords : Microelectrode Array, Neural Network, Electrical Stimulation